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## EX5a - Introduction to Intel VTune Amplifier 2018

### Goals

- Learn how to create VTune analysis project for OpenCL kernels

### Procedures

- You will need to have an OpenCL Host application built (EXE) which launches the desired OpenCL kernel to be analyzed. The test application can be provided with command-line parameters to configure, if so desired
  - We will use **ee524\_L5\_vtune\_mmul\_test.exe**
    - and test kernel file: **intel\_naive\_mmul.cl**
  - Get all these files from *CourseWeb/Files/InclassExercises/EX5*
  - Put them into a local VTune/EE524\_L5 folder
- Open Intel VTune Amplifier 2018
  - Must use **Run as Administrator** (Have professor or TA log in as Admin)
- Click New Project button on top menu bar
  - Name: ee524\_MMUL\_Analysis\_L5
- On the Analysis Target page
  - On Launch Application window click folder icon to right of Application: box
  - Select the test host application: **ee524\_L5\_vtune\_mmul\_test.exe**
  - Application parameters: 4 5 512 2 32
- Click Analysis Type tab (just below Choose Analysis Type)
  - Choose: Platform Analysis / GPU Hotspots
  - In righthand window
    - GPU Sampling interval, ms = 0.1
    - Analyze Processor Graphics Hardware events: *Compute Extended*
    - leave Trace OpenCL and Intel Media SDK programs CHECKED
- Click blue **Start** button on upper far right
  - when test runs, a console window will open and you'll see some Host output
  - Wait while VTune completes Finalizing Result
    - dont worry about error messages: "Cannot locate debugging..."
  - When results are complete, the Summary window should open in VTune.
- In right-hand Project Navigator, right click your new results file ('r000gh' or similar)
  - choose Rename and name OPT0\_5\_512\_2\_32\_CompExt. Save.
- Repeat the same steps above but use the following option:
  - Analyze Processor Graphics Hardware events: *Overview*
  - Start. When done rename to OPT0\_5\_512\_2\_32\_Overview. Save.
- Click New Analysis button on top toolbar to create a new analysis configuration
  - On Analysis Target / Application Parameters: 3 5 512 2 32
  - Analysis Type: same as before
  - Start. When done rename to OPT1\_5\_512\_2\_32\_CompExt. Save.
- Click New Analysis button on top toolbar to create a new analysis configuration

- On Analysis Target / Application Parameters: 2 5 512
- Analysis Type: same as before
- Start. When done rename to OPT4\_5\_512\_CompExt. Save.
- Walk through UI and Graphics window along with Professor in-class lecture/demo.
  - Learn how to use UI windows and features to investigate analysis results

#### Outcomes

- A new VTune project has been created
- Analysis result sets for GPU Hotspots / Compute Extended have been collected
  - OPT0 - Naive MMUL kernel
  - OPT1 - MMUL kernel with private accumulator
  - OPT4 - MMUL kernel using local memory and each WI computing full output row

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### EX5b - VTune Analysis of Block MMUL Kernel (OPT5)

#### Goals

- Continue to get familiar with VTune for GPU/OpenCL analysis
- Add Analysis sets for variants of Block MMUL (OPT5)

#### Procedures

- Using the same VTune project from EX5a
  - and the same host test application and kernel files
- Add new Analysis sets for following runs:
  - On Analysis Target / Application Parameters: 1 0 5 512 16
    - Analysis Type: same as before
    - Start. When done rename to **OPT5\_v0\_5\_512\_CompExt**. Save.
  - On Analysis Target / Application Parameters: 1 1 5 512 16
    - Analysis Type: same as before
    - Start. When done rename to **OPT5\_v1\_5\_512\_CompExt**. Save.
  - On Analysis Target / Application Parameters: 1 2 5 512 16
    - Analysis Type: same as before
    - Start. When done rename to **OPT5\_v2\_5\_512\_CompExt**. Save.

#### Outcomes

- Total of 6 VTune analyses run under new L5 Project.
  - OPT0, OPT1, OPT4, OPT5 (v0, v1, v2)